User’s Manual

Powerline 85M
Wireless-G Extender

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FCC Part 68

This equipment complies with Part 68 of the FCC Rules. On the bottom of this equipment is a label that contains the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. You must provide this information to the telephone company upon request.

The REN is useful to determine the quantity of devices you may connect to the telephone line and still have those entire devices ring when your number is called. In most, but not all areas, the sum of the REN of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area.

If the modem causes harm to the telephone network, the telephone company may discontinue your service temporarily.
If possible, they will notify you in advance. But if advance notice isn't practical, you will be notified as soon as possible.
You will be advised of your right to file a complaint with the FCC.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this modem, please contact your dealer for repair/warranty information. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected or you are sure that the equipment is not malfunctioning.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

FCC Part 15

The modem generates and uses radio frequency energy. If it is not installed and used properly in strict accordance with the user's manual, it may cause interference with radio and television reception. The modem has been tested and found to comply with the limits for Class B computing devices in accordance with the specifications in Subpart B, Part 15 of the FCC regulations. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. FCC regulations require that shielded interface cables be used with your modem.

If interference does occur, we suggest the following measures be taken to rectify the problem:

1) Move the receiving antenna.

2) Move the modem away from the radio or TV.

3) Plug the modem into a different electrical outlet.

4) Discuss the problem with a qualified radio / TV technician.

CAUTION:

Changes or modifications not expressly approved by the party responsible for compliance to the FCC Rules could void the user's authority to operate this equipment.

Cable connections:

All equipment connected to this modem must use shielded cable as the interconnection means.

Notes:

Operation is subject to the following two conditions:

1) This device may not cause harmful interference, and

2) This device must accept any interference received including interference that may cause undesired operation.

Chapter 1 Introduction

Congratulations on your purchase of an Instant Powerline 85M Wireless Extender. The Powerline Extender is the perfect option to connect a small group of PCs or small wireless clients. Integrated Wireless to Powerline networks, the device can extend large coverage and less dead space for your home network.

1.1 Overview

Integrated with 4 10/100M ports, it will very easy to use as a switch, and combine the wireless and Powerline function inside. Using Powerline and wireless benefit, you can connect the pc to internet in anywhere of your home..

1.2 Features

- Internet Access
  - TCP/IP, UDP, ICMP, ARP, RARP, Static IP assignment
- Standard
  - IEEE 802.3, 802.3u Ethernet standards
  - HomePlug 1.0
  - IEEE 802.11b and 802.11g Wireless standards
- QoS
  - Prioritized random access, contention-free access and segment bursting
  - CSMA/CA with prioritization and ARQ for reliable delivery of Ethernet packets via Packet Encapsulation Security Features
- Powerline Modulation
  - OFDM (Orthogonal Frequency Division Multiplexing) with patented signal processing techniques for high data reliability in noisy media conditions
  - Supports QAM 256/64/16, DQPSK, DBPSK and ROBO modulation schemes
- Security
  - Provide 56-bit DES link encryption for Powerline network
- Wireless Features
  - Support 802.11b/g Wireless Access Point
  - Support 128-Bit and 64-Bit WEP encryption , 802.1x, WPA, WPA2
- Other
  - High-Speed Powerline adapter with Ethernet interface for fast data transfer over the existing household power supply
  - The high-speed transfer rates of 85Mbps even make it possible to transmit video in DVD quality
  - No need new wires and use at any power socket with up to ranges of 200 meters

- HTTP Web-Based Management
  - Firmware upgrade by UI
  - Password protected access

1.3 System Requirements

1) Personal computer (PC)
2) Pentium II 233 MHz processor minimum
3) 32 MB RAM minimum
4) 20 MB of free disk space minimum
5) Ethernet Network Interface Controller (NIC) RJ45 Port
6) Internet Browser

Chapter 2 Installation

This chapter offers information about installing your router. If you are not familiar with the hardware or software parameters presented here, please consult your service provider for the values needed.

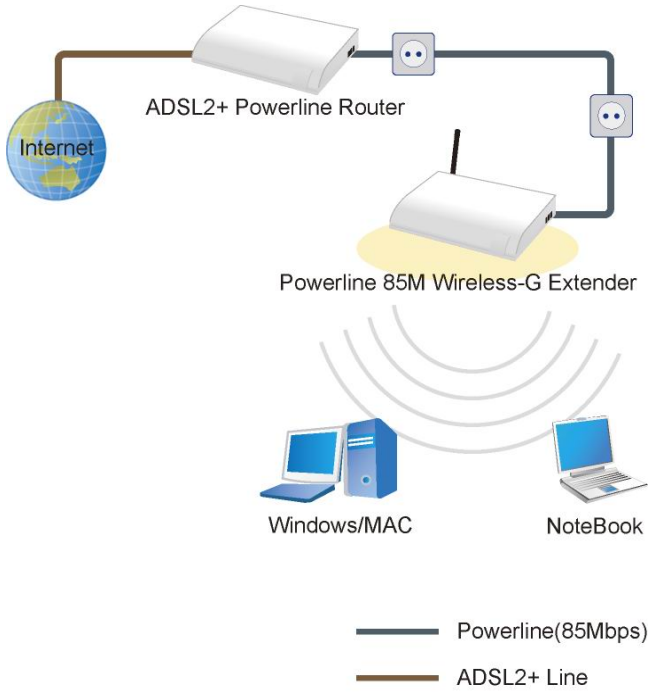
2.1 Checklist

Check the shipping box carefully to ensure that the contents include the items you ordered. If any of the items are missing or damaged, contact your local distributor. The contents of your carton may vary depending on your service provider.

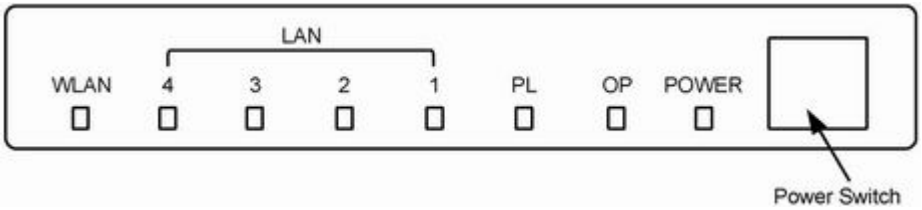
Contents description

1) Powerline Router for home/office use
2) Powerline Router Installation and Operation Guide (this publication)
3) Power Cord
4) Ethernet cable Ethernet category 5 twisted pair cable (6 ft)

Application for this device

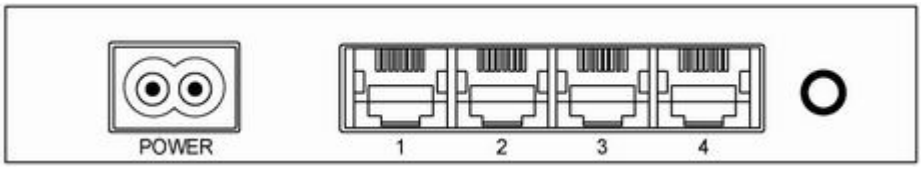


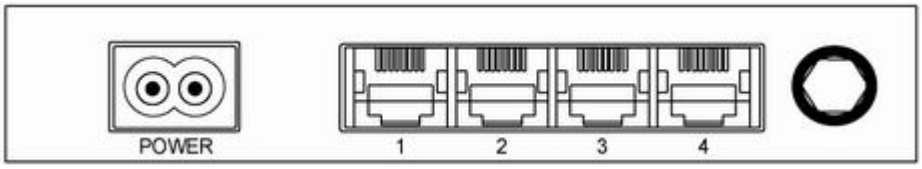
2.2 The Front LEDs



LED	State	Description
POWER	ON	Press the button to power one the router.
OP	Flashing	The router running well.
PL	Flashing	When the device detect other Powerline devices
LAN 1-4	ON	Link
	Flashing	TX or RX activity
	OFF	No Link These four LAN (Local Area Network) ports are where you will connect networked devices, such as PCs, print servers remote hard drives, and anything else you want to put on your network.
WLAN	ON	Wireless On
	Flashing	Data transfer between AP and wireless clients
	OFF	No link.

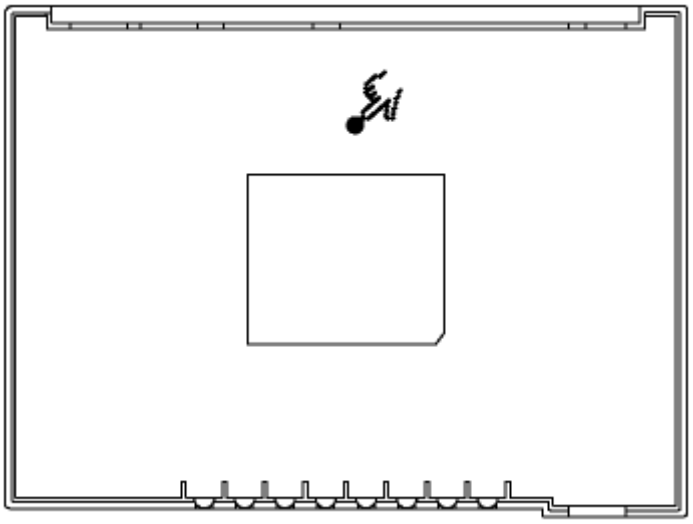
2.3 The Rear Ports





Connector	Description
POWER	Connect to power cord.
LAN (1-4)	Router is successfully connected to a device through the corresponding port (1, 2, 3 or 4). If the LED is flashing, the Router is actively sending or receiving data over that port.
Antenna	There are two kind of connecter, fixed or R/SMA connecter.

2.4 The Bottom Port



Connector	Description
Reset Switch	The reset button, the router restore default settings when press until reboot.

Chapter 3 Configuration

3.1 Determine your connection settings

Before you configure the router; you need to know the connection information supplied by your service provider.

3.2 Connecting the Powerline Extender to your network

Unlike a simple hub or switch, the setup of the Powerline Extender consists of more than simply plugging everything together.

3.3 Configuring with Web Browser

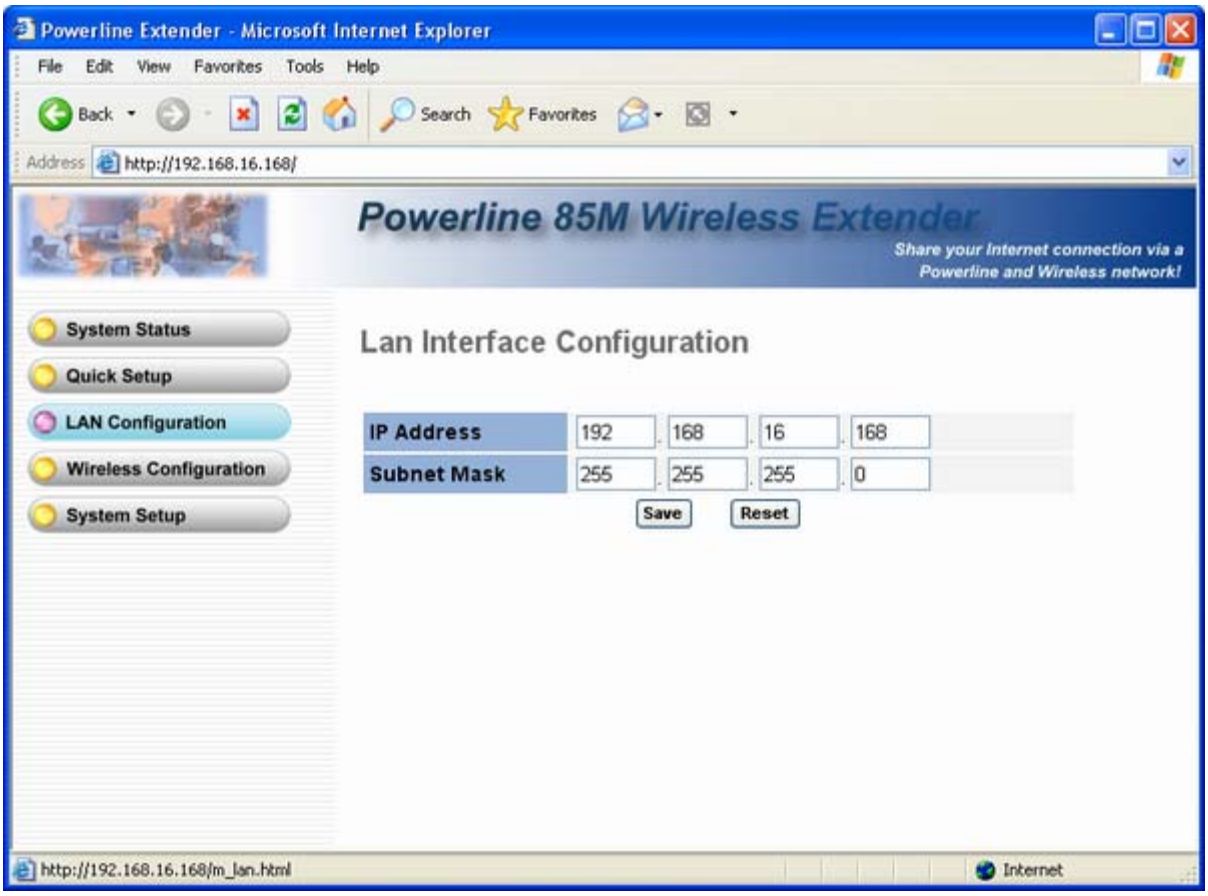
It is advisable to change the administrator password to safeguard the security of your network.

To configure the router, open your browser, type '**http://192.168.16.168**' into the address bar and click 'Go' to get to the login page. Save this address in your Favorites for future reference.

At the Password prompt, the User name is '**admin**' and the password is '**admin**'. You can change these later if you wish. Click **'OK**' to login.

You can use "**Quick Setup**" to setup the device, and choose the connect mode you prefer.

3.3.1 LAN Interface Configuration



You can set static IP address at here..

3.4.1 Wireless Settings

Wireless Mode

Support Auto, 802.11b only, 802.11g only, Disable modes.

SSID

The identifier set for the wireless network. You can change the SSID. Only devices with the same SSID can interconnect.

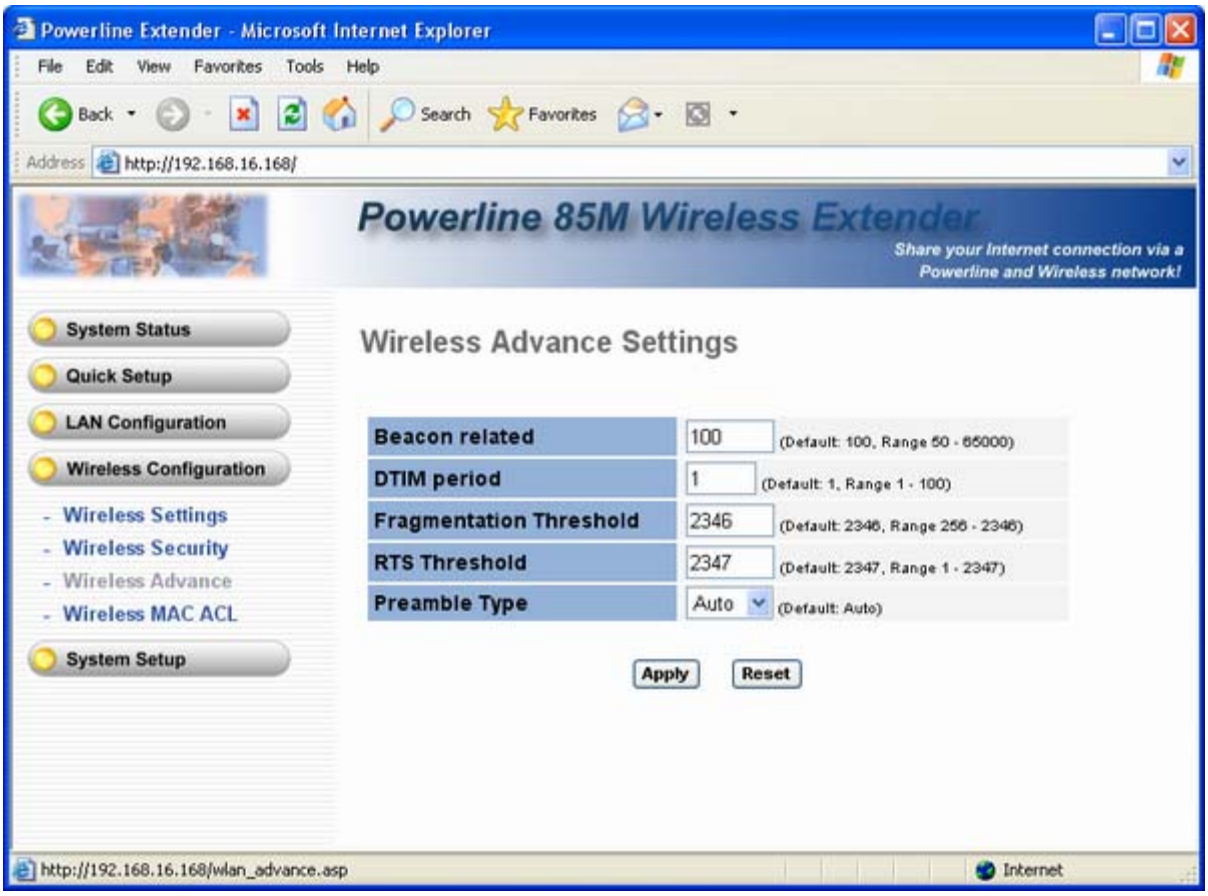
Channel ID

The channel number is used for wireless network. The channel setting of the wireless devices within a network should be the same.

3.4.2 Wireless Security

The Authentication type supports “Open system”, “Shared key”, “WPA-PSK”, “WPA2-PSK” and "WPA-PSK/WPA2-PSK".

3.4.3 Wireless Advance


Powerline Extender - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://192.168.16.168/
Powerline 85M Wireless Extender
Share your Internet connection via a Powerline and Wireless network!
System Status
Quick Setup
LAN Configuration
Wireless Configuration
- Wireless Settings
- Wireless Security
- Wireless Advance
- Wireless MAC ACL
System Setup
Wireless Advance Settings
Beacon related 100 (Default: 100, Range 50 - 65000)
DTIM period 1 (Default: 1, Range 1 - 100)
Fragmentation Threshold 2346 (Default: 2346, Range 256 - 2346)
RTS Threshold 2347 (Default: 2347, Range 1 - 2347)
Preamble Type Auto (Default: Auto)
Apply
Reset
http://192.168.16.168/wlan_advance.asp
Internet

You can change some wireless advanced parameters at this page. Keep the setting as the default if you are not the professional user.

3.4.4 Wireless MAC ACL

You can set which wireless client's MAC addresses is allowed or rejected to link to the router via wireless. For advanced security issue, you can enable this function.

3.5.1 System Setup

1) The user account can rename or password can reset here.

2) You can upgrade the new firmware here while you download the latest firmware via our website. Click browser to choose the new firmware and press the Update button to start.

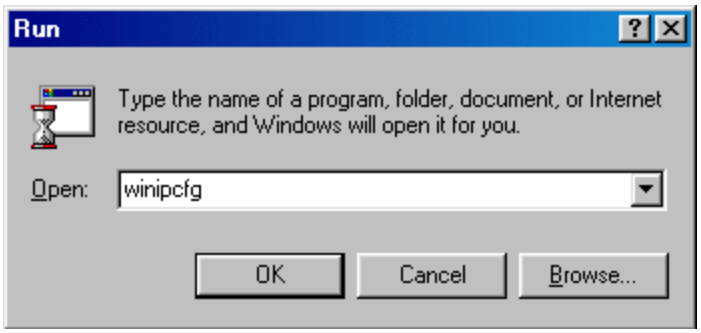
3) To retrieve the factory default settings please press the factory default button.

4) Press System Restart button to restart the device.

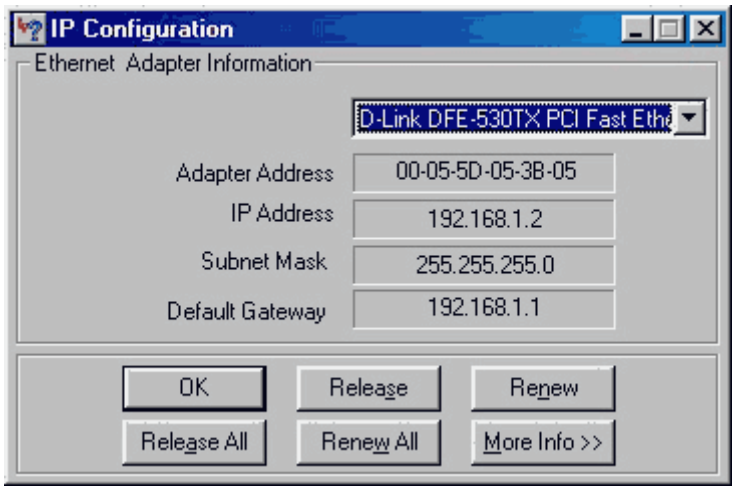
3.6.1 TCP/IP Settings for Windows Operating System

1. How can I find my IP Address in Windows 95, 98, or Me?

- Click on **Start**, then click on **Run**.
- The Run Dialogue Box will appear. Type **winipcfg** in the window as shown then click OK



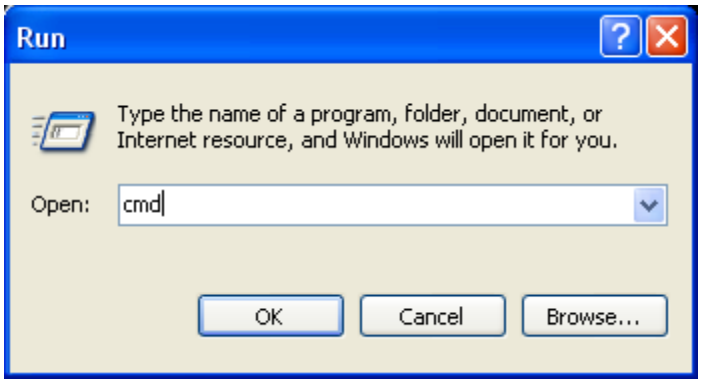
- The **IP Configuration** window will appear, displaying your **Ethernet Adapter Information**.
- Select your adapter from the drop down menu.
- If you do not see your adapter in the drop down menu, your adapter is not properly installed.



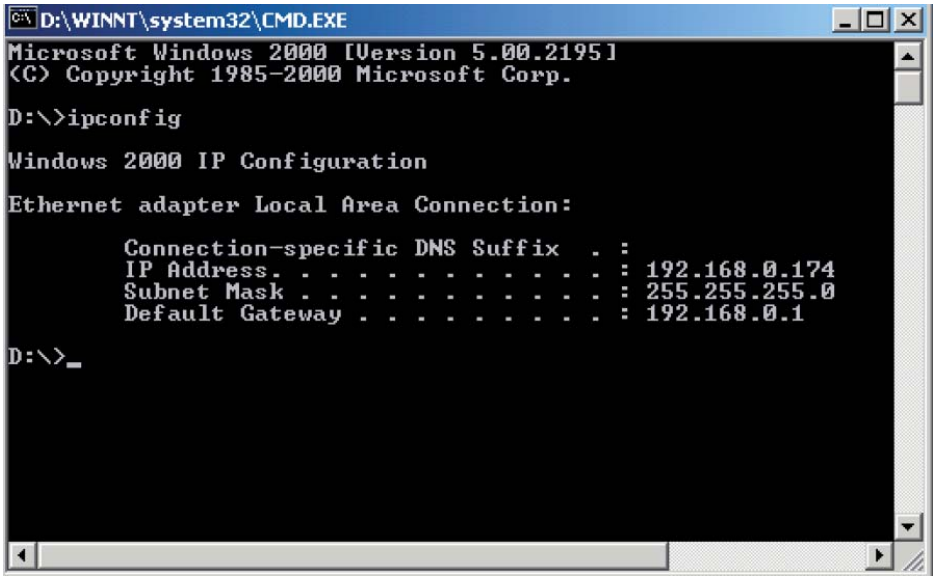
- After selecting your adapter, it will display your IP Address, subnet mask, and default router.
- Click **OK** to close the IP Configuration window.

2. How can I find my IP Address in Windows 2000/XP?

- Click on **Start** and select **Run**.
- Type **cmd** then click **OK**.



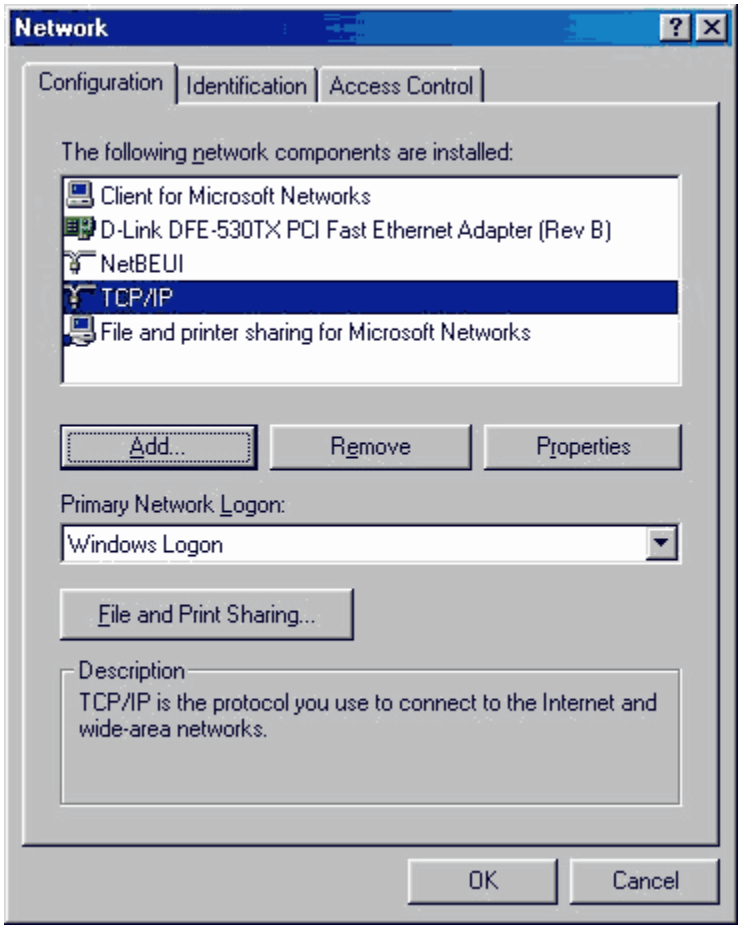
- From the Command Prompt, enter **ipconfig**. It will return your IP Address, subnet mask, and default router.


D:\WINNT\system32\CMD.EXE
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.
D:\>ipconfig
Windows 2000 IP Configuration
Ethernet adapter Local Area Connection:
Connection-specific DNS Suffix . :
IP Address. . . . . : 192.168.0.174
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.0.1
D:\>

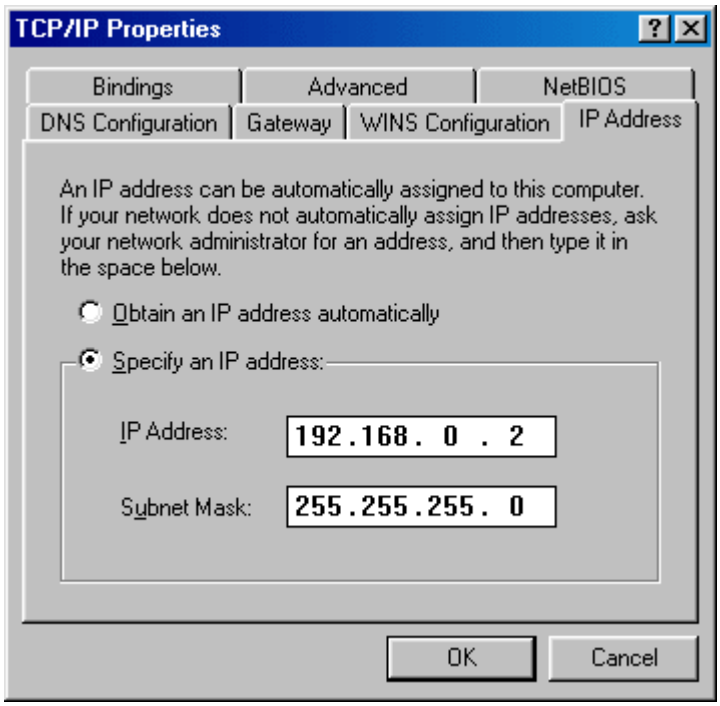
- Type exit to close the command prompt.
- Make sure you take note of your computer´s Default Router IP Address. The Default Router is the IP Address of the router. By default, it should be 192.168.0.1

3. How can I assign a Static IP Address in Windows 98/Me?

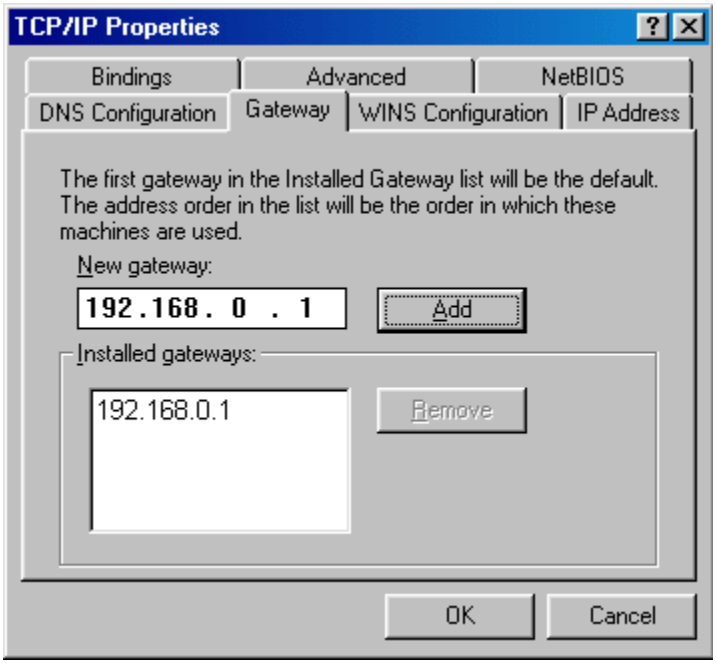
- From the desktop, right-click on the **Network Neighborhood** icon (Win ME - My Network Places) and select **Properties**.
- Highlight **TCP/IP** and click the **Properties** button. If you have more than 1 adapter, then there will be a TCP/IP "Binding" for each adapter. Highlight **TCP/IP > (your network adapter)** and then click **Properties**.



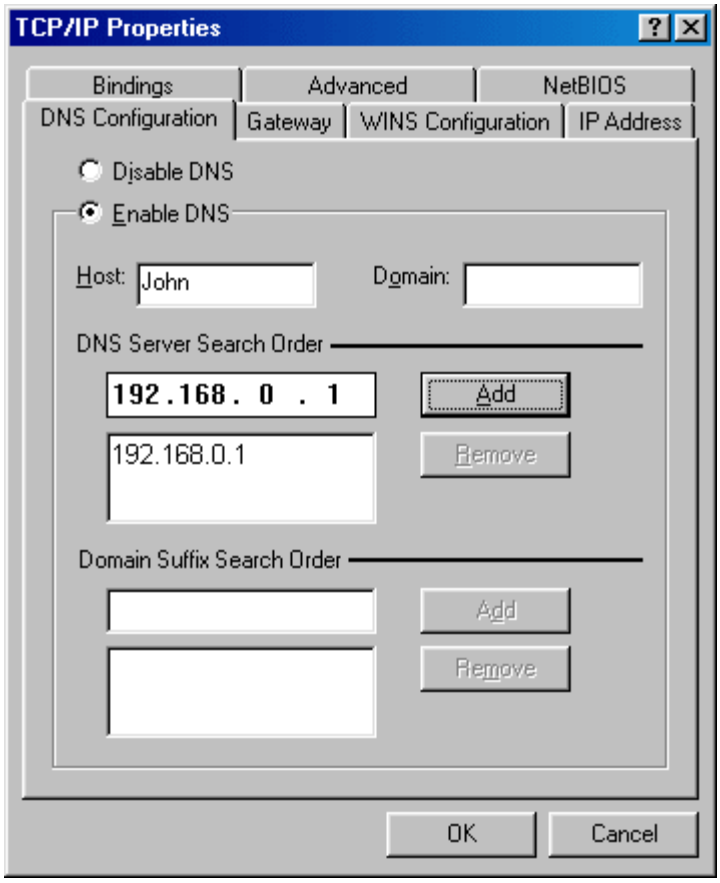
- Click **Specify an IP Address**.
- Enter in an IP Address that is on the same subnet as the LAN IP Address on your router. Example: If the router´s LAN IP Address is 192.168.0.1, make your IP Address 192.168.0.X where X is between 2-99. Make sure that the number you choose is not in use on the network.



- Click on the **Router** tab.
- Enter the LAN IP Address of your router here (192.168.0.1).
- Click **Add** when finished.



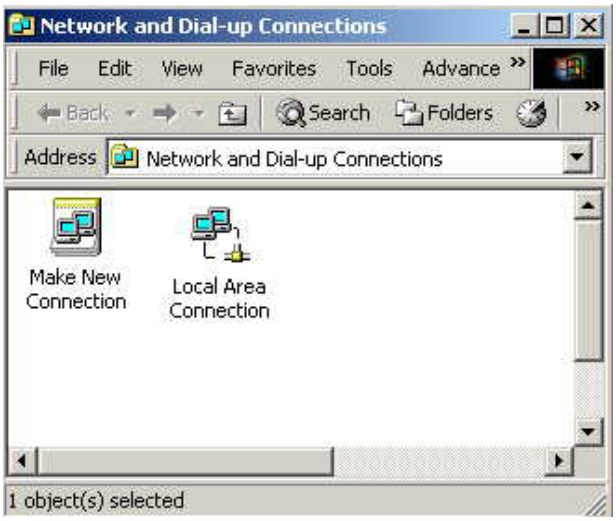
- Click on the **DNS Configuration** tab.
- Click **Enable DNS**. Type in a **Host** (can be any word). Under DNS server search order, enter the LAN IP Address of your router (192.168.0.1). Click **Add**.



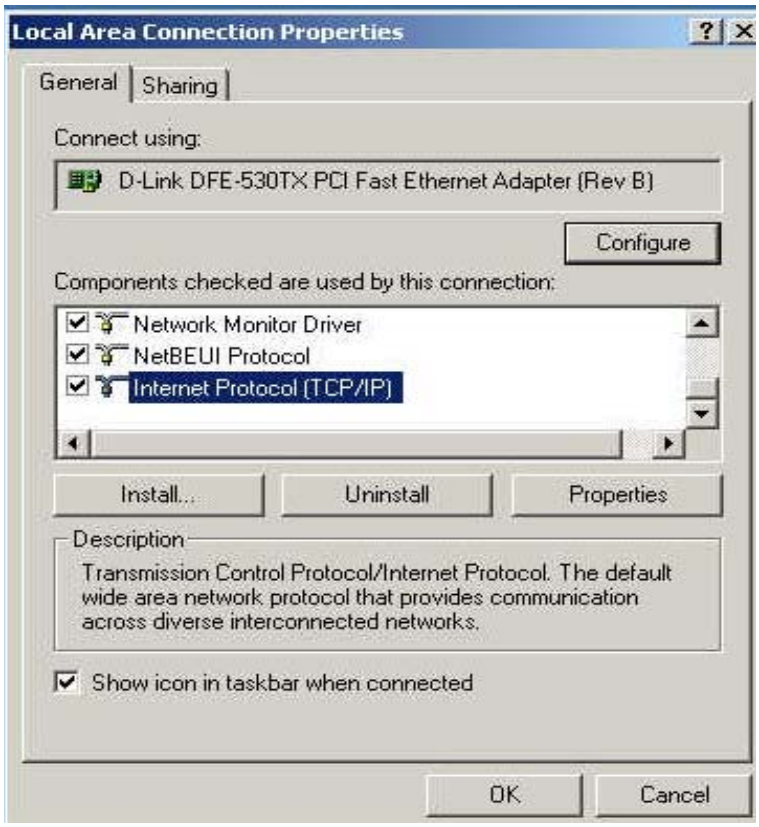
- Click **OK** twice.
- When prompted to reboot your computer, click **Yes**. After you reboot, the computer will now have a static, private IP Address.

4. How can I assign a Static IP Address in Windows 2000?

- Right-click on **My Network Places** and select **Properties**.
- Right-click on the **Local Area Connection** which represents your network card and select **Properties**.



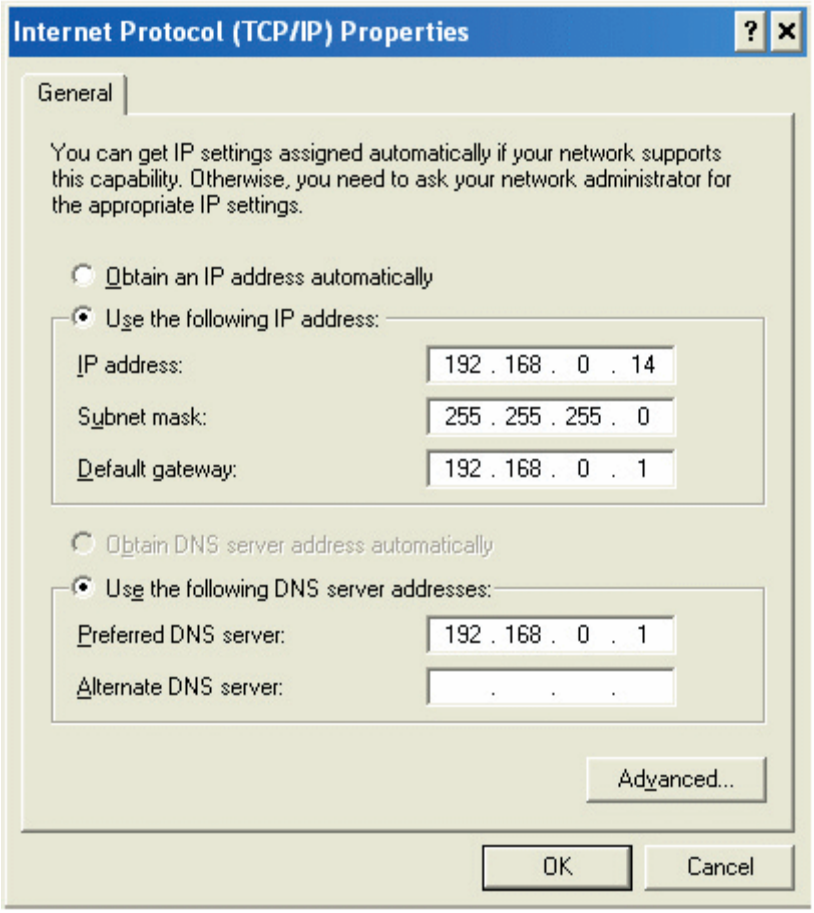
- Highlight **Internet Protocol (TCP/IP)** and click **Properties**.


Local Area Connection Properties
General Sharing
Connect using:
D-Link DFE-530TX PCI Fast Ethernet Adapter (Rev B)
Configure
Components checked are used by this connection:
Network Monitor Driver
NetBEUI Protocol
Internet Protocol (TCP/IP)
Install... Uninstall Properties
Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
Show icon in taskbar when connected
OK Cancel

- Click **Use the following IP Address** and enter an IP Address that is on the same subnet as the LAN IP Address on your router. Example: If the router´s LAN IP Address is 192.168.0.1, make your IP Address 192.168.0.X where X = 2-99. Make sure that the number you choose is not in use on the network.
- Set the **Default Router** to be the same as the LAN IP Address of your router (192.168.0.1).
- Set the **Primary DNS** to be the same as the LAN IP address of your router (192.168.0.1).
- **The Secondary DNS** is not needed or enter a DNS server from your ISP.
- Click **OK** twice. You may be asked if you want to reboot your computer. Click **Yes**.

5. How can I assign a Static IP Address in Windows XP?

- Click on **Start > Control Panel > Network and Internet Connections > Network connections**.
- See the steps for assigning a static IP address in Windows 2000 and continue from there.


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 0 . 14
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 192 . 168 . 0 . 1
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server: 192 . 168 . 0 . 1
Alternate DNS server:
Advanced...
OK
Cancel

- Access the Web management. Open your Web browser and enter the IP Address of your router device in the address bar. This should open the login page for the Web management. Follow instructions to login and complete the configuration.

Chapter 4. Powerline Networking Utility

Note. The device can auto detect the other powerline bridges which plug in the same power circuit, you don't need to use this powerline utility except you want to encryption all the powerline devices as the same group or you can not access the other computers .

Introduction of Configuration Utility

The Configuration Utility for Windows OS enables the user to find Powerline Ethernet devices on the Powerline network; measures data rate performance, ensures privacy, performs diagnostics and secures Powerline networks.

4.1 Configuration Utility Setup

4.1.1 Installation of the Utility

Please verify that no other Powerline Management Utilities are installed before installing this product. If other utilities are installed, uninstall them and restart before installing this software.

To install, insert the Windows OS Configuration Utility Setup utility CD-ROM into the computer's CD-ROM drive. The Setup utility shall run automatically. Alternatively this can also be done manually by double clicking the setup.exe file on the CD. The CD will launch an installation utility similar to the one shown in *Figure 1*.

Click the **Next** button to continue.

Powerline Ethernet Adapter - InstallShield Wizard
Powerline Ethernet
HOME NET
Welcome to the InstallShield Wizard for Powerline Ethernet Adapter
The InstallShield(R) Wizard will install Powerline Ethernet Adapter on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
< Back
Next >
Cancel

Figure 1: Install Shield Screen

4.2 Windows Configuration Utility

In order to run the utility, double-click the utility icon. *Figure 2* shows the main screen of the configuration utility. This screen shot shows a Powerline Ethernet device connected as a local device and other Powerline Ethernet devices as remote devices.

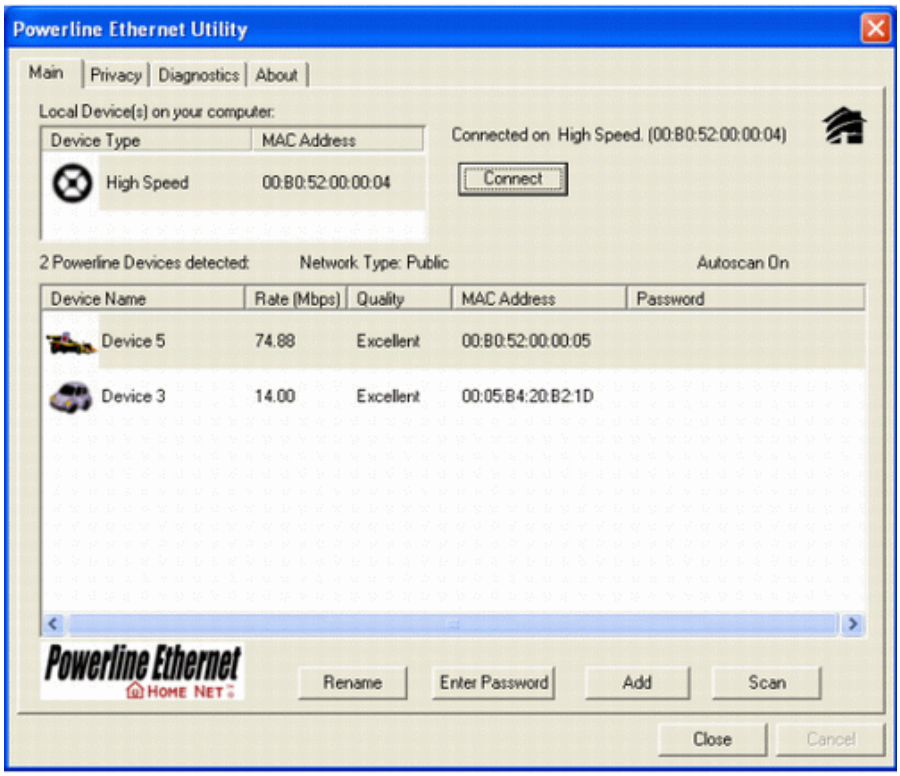


Figure 2: Main Screen with High-Speed Powerline Ethernet device Local

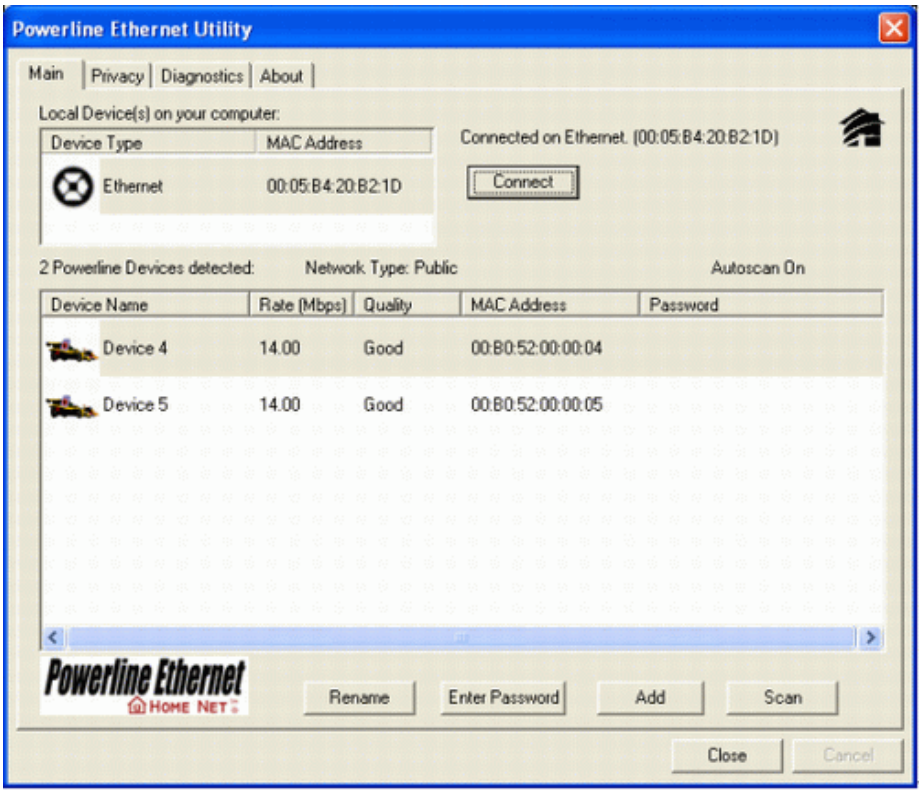


Figure 3 : Main Screen with Low-Speed Powerline Ethernet device Local

4.3 User Interface

4.3.1 Main Screen

The **Main** screen essentially provides a list of all Powerline Ethernet devices logically connected to the computer where the utility is running. The top panel shows all local Powerline Ethernet devices found connected to the computer's NIC (Network Interface Card). In most cases, only one device will be seen. In situations where there are more than one device connected, such as a USB and also an Ethernet device, the user may click to select the one to manage through and then click the **Connect** button to its right. The status area above the button indicates that your PC is connected to that same device. Once connected to the chosen local device, the utility will automatically scan the power line periodically for any other Powerline Ethernet devices. If no local Powerline Ethernet devices are discovered, the status area above the connect button will indicate that accordingly. *Figure 4* illustrates the presence of two local devices in the computer.

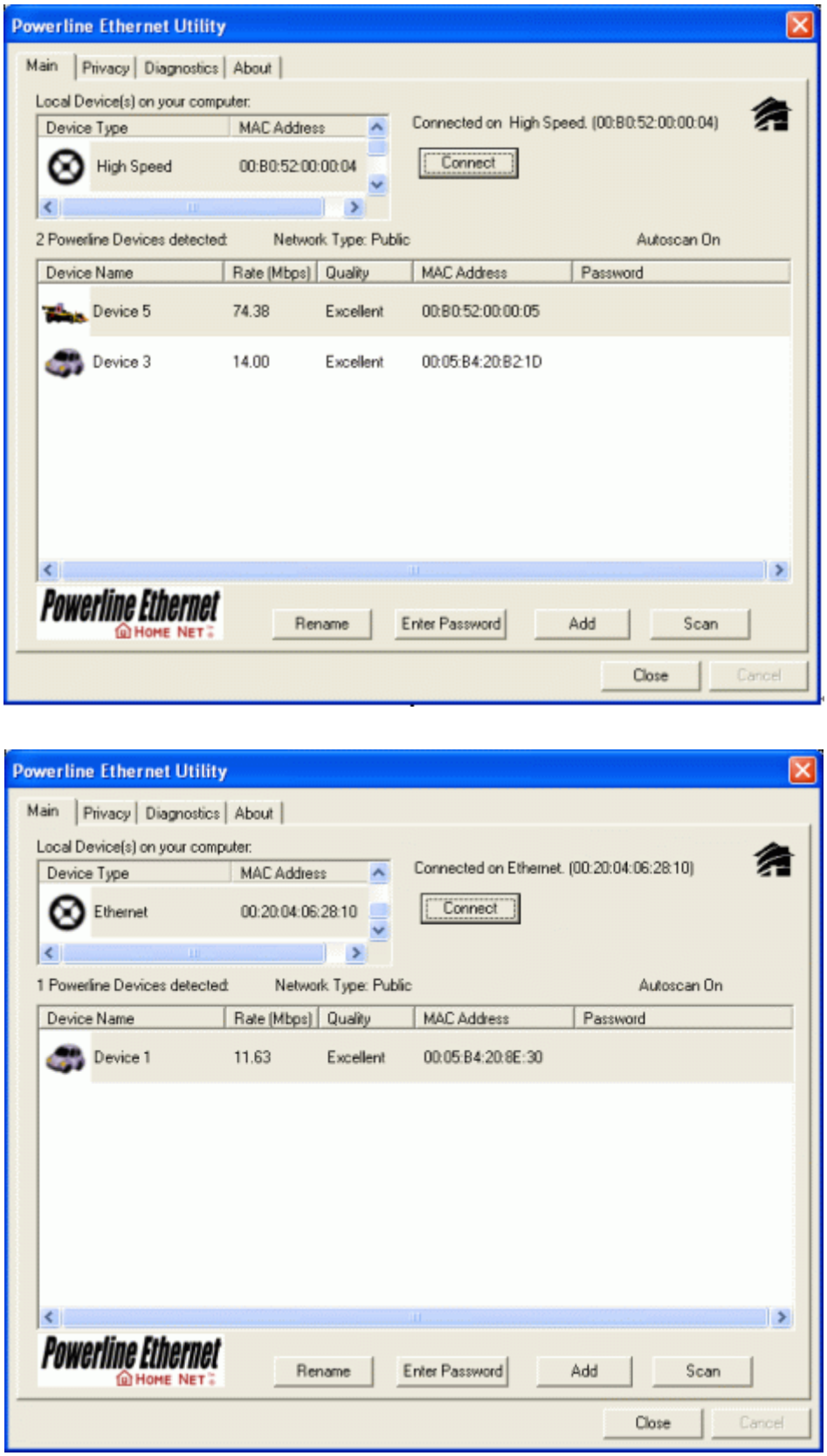


Figure 4: Multiple Local Device Connection

The **lower panel** displays all the Powerline Ethernet devices, discovered on the current logical network (remote devices). Displayed immediately above this panel is the number of remote devices found, the type of logical network (Public or Private), and a message area that reports connectivity and scan status. The following information is displayed for each of the devices discovered that appear in the lower panel:

Device Name column shows the default device name, which may be user re-defined. A user may change the name by clicking on the name and editing in-place, or by using the rename button. An icon is optionally shown with the name. A distinction in icons is made between low-speed and high-speed devices (14Mbps and 85Mbps). By default, the icon is displayed with the name.

MAC Address column shows the device's MAC address.

Password column shows the user-supplied device password (initially left blank).
A user may enter the password by using the Set Password button. To set the **Password** of the device (required when creating a private network), first select the device by clicking on its name in the lower panel and then click on the Enter Password button .A dialog box will appear as shown in Figure 5 to type the password. The selected device name is shown above the field for entering the password. Hit OK after entering the new password. A confirmation box will appear if the password was entered correctly. If a device is not found, the user will be notified and suggestions to resolve common problems will be presented.

Figure 5: Set Device Password

The **Add** button is used to add a remote device to your network that is not on the displayed list in the lower panel, for example, a device currently on another logical network. Users are advised to locate the passwords for all devices they wish to manage and add them to the local logical network by clicking on the Add button. A dialog box will appear as seen below. The dialog box allows the user to enter both a device name and the password. A confirmation box will appear if the password was entered correctly and if the device was found. If a device is not found, the user will be notified and suggestions to resolve common problems will be presented.

Figure 6: Add Remote Device

Note: The device must be present on the power line (plugged in) in order for the password to be confirmed and added to the network. If the device could not be located, a warning message will be shown.

The **Scan** button is used to perform an immediate search of the Powerline Ethernet devices connected to the computer. By default the utility automatically scans every few seconds and updates the display. A typical screen after naming and supplying passwords might appear as in *Figure 7*.

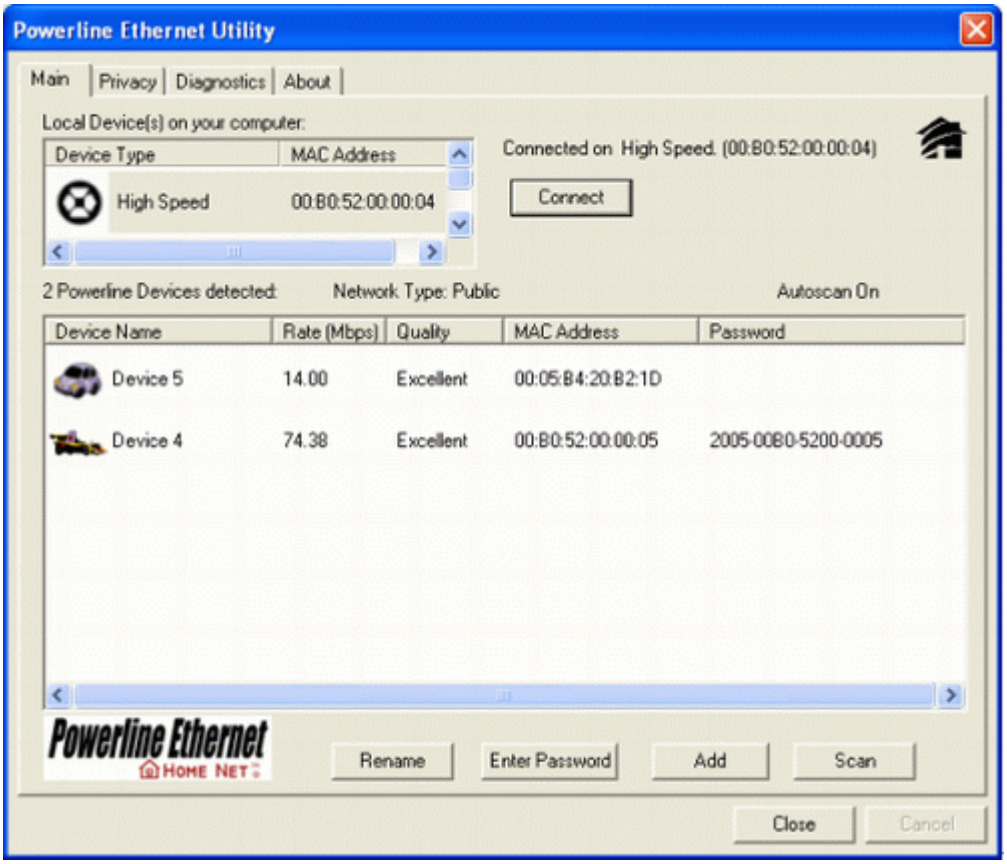


Figure 7: Main Screen of the Configuration Utility

4.3.2 Privacy Screen

The Privacy dialog screen provides a means for managing the local network and providing additional security. All Powerline Ethernet devices are shipped using a default logical network (network name), which is normally **“HomePlug”** . The **Privacy** dialog screen allows user to make the network private by changing the network name (network password) of devices. The user can always reset a Powerline Ethernet network to the universal one (public) by entering “HomePlug” as the network name or by clicking on the **Use Default** button.

Note : Changing the network name to any other name other than HomePlug will show the network type on the main screen as Private.

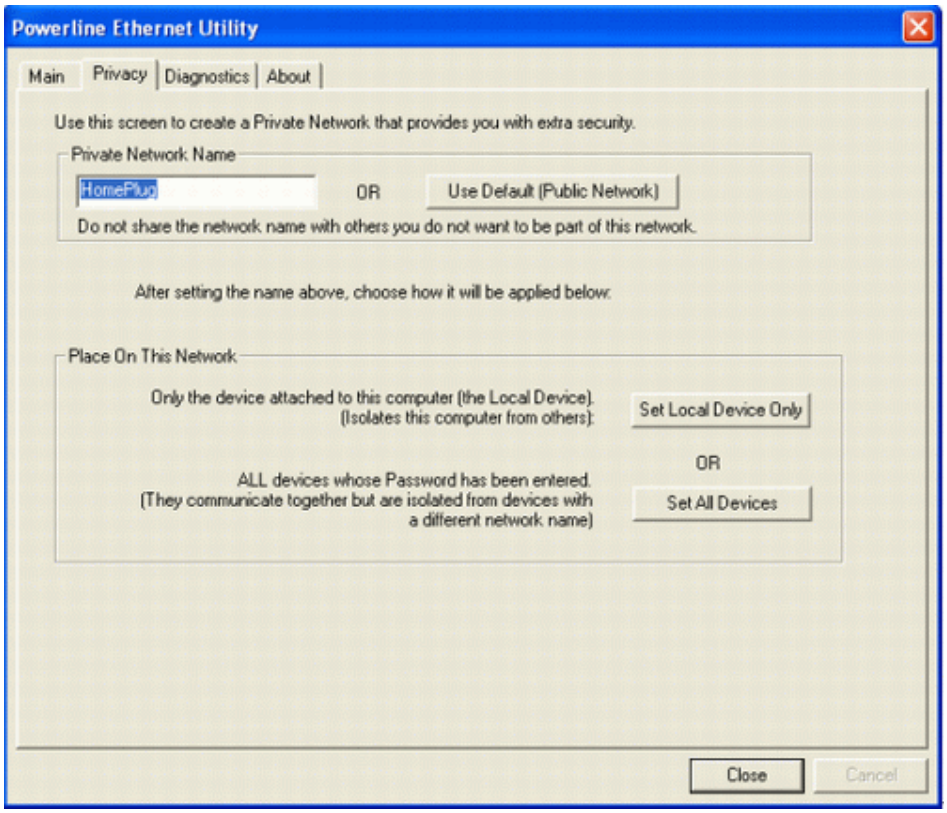

Powerline Ethernet Utility
Main
Privacy
Diagnostics
About
Use this screen to create a Private Network that provides you with extra security.
Private Network Name
HomePlug
OR
Use Default (Public Network)
Do not share the network name with others you do not want to be part of this network.
After setting the name above, choose how it will be applied below:
Place On This Network
Only the device attached to this computer (the Local Device).
(Isolates this computer from others):
Set Local Device Only
OR
ALL devices whose Password has been entered.
(They communicate together but are isolated from devices with a different network name)
Set All Devices
Close
Cancel

Figure 8: Privacy Screen

The **Set Local Device Only** button is used to change the network name (network password) for the local device only. After doing this, all the devices seen on the Main panel prior to this will no longer be able to communicate or respond to the computer, as they will be on a different logical network. Devices previously set up with the same logical network (same network name) will appear in the device list afterward selecting this option.

The **Set All Devices** button is used to change the logical network of all devices that appear on the Main panel. The user must have entered the device's Password in order to set it to the new logical network. A notification message will appear to report the success of this operation.

4.4 Diagnostics Screen

The **Diagnostics** screen shows system information and a history of all devices seen. The appearance is shown in *Figure 9*.

The **upper panel** shows technical data concerning software and hardware on the host computer used to communicate over Powerline Ethernet Network. It shall include the following:

- Operating System Type/Version
- Host Network Name
- User Name
- MAC Address of all NICs (network interface card)
- Identify versions of all Driver DLLs and Libraries used (NDIS) and optionally
- Powerline Ethernet device chipset manufacturer name (85Mbps version Only)
- MAC Firmware Version (85Mbps version Only)
- Vendor name

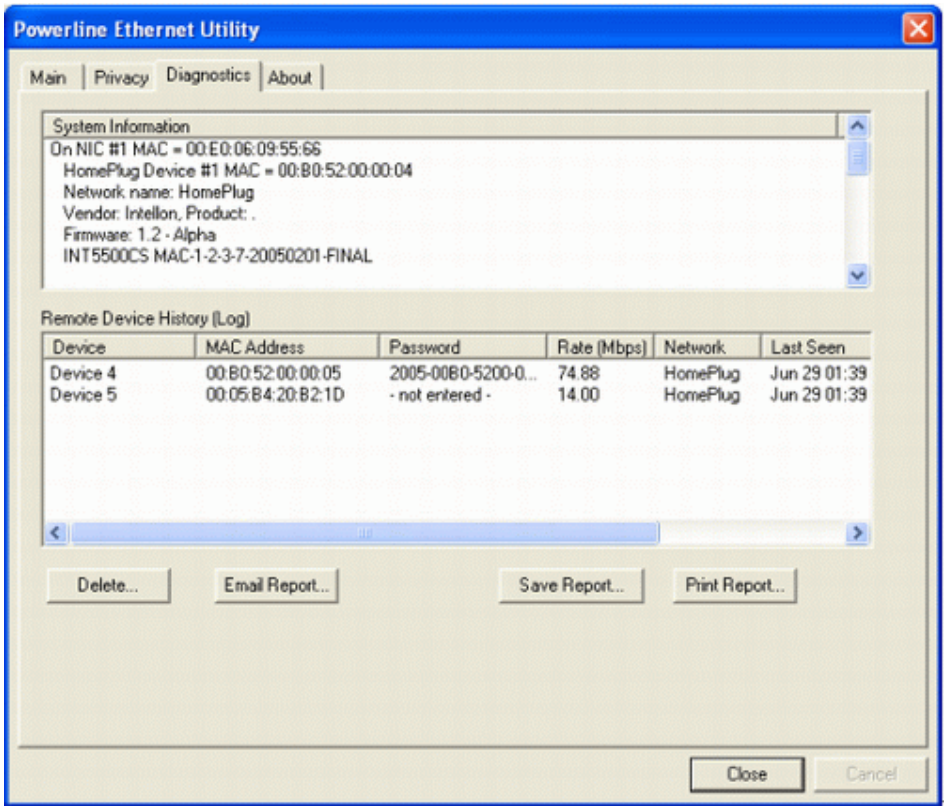


Figure 9: Diagnostics Screen

The **lower panel** contains a history of all remote devices seen on the computer, over time. Devices are shown here regardless of whether or not they are on the same logical network. Devices that are active on the current logical network will show a transfer rate in the Rate column; devices on other networks, or devices that may no longer exist are shown with an “?” in the Rate column. The following remote device information is available from the diagnostics screen:

- Adapter Alias Name
- Adapter MAC Address
- Adapter Password

- Adapter Last known rate
- Adapter Last Known Network
- HomePlug chipset manufacturer name
- Date device last scanned
- MAC Firmware Version (85Mbps version Only)

The diagnostics information displayed may be saved to a text file for later emailing to technical support of a manufacturer, or printed for reference during a technical support call. Devices no longer part of the network can be deleted using the delete button.

4.4.1 About Screen

The screen shows the software release date.

Figure 10: About dialog screen

4.4.2 Preferences

The lower part of the panel may display options for user preferences (such as turning the auto-scan feature on or off) as shown *Figure 10* above.

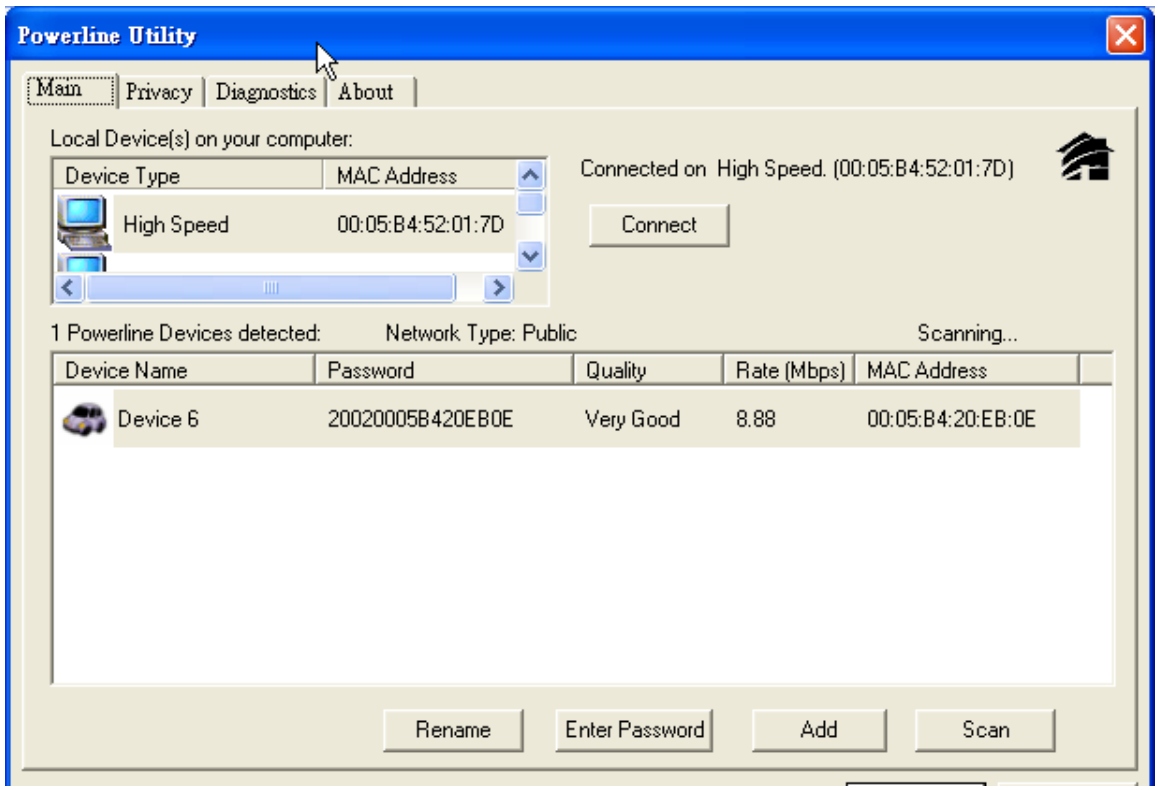
4.5 Troubleshooting

This section will introduce how to solve the connect problem for management remote Powerline devices.

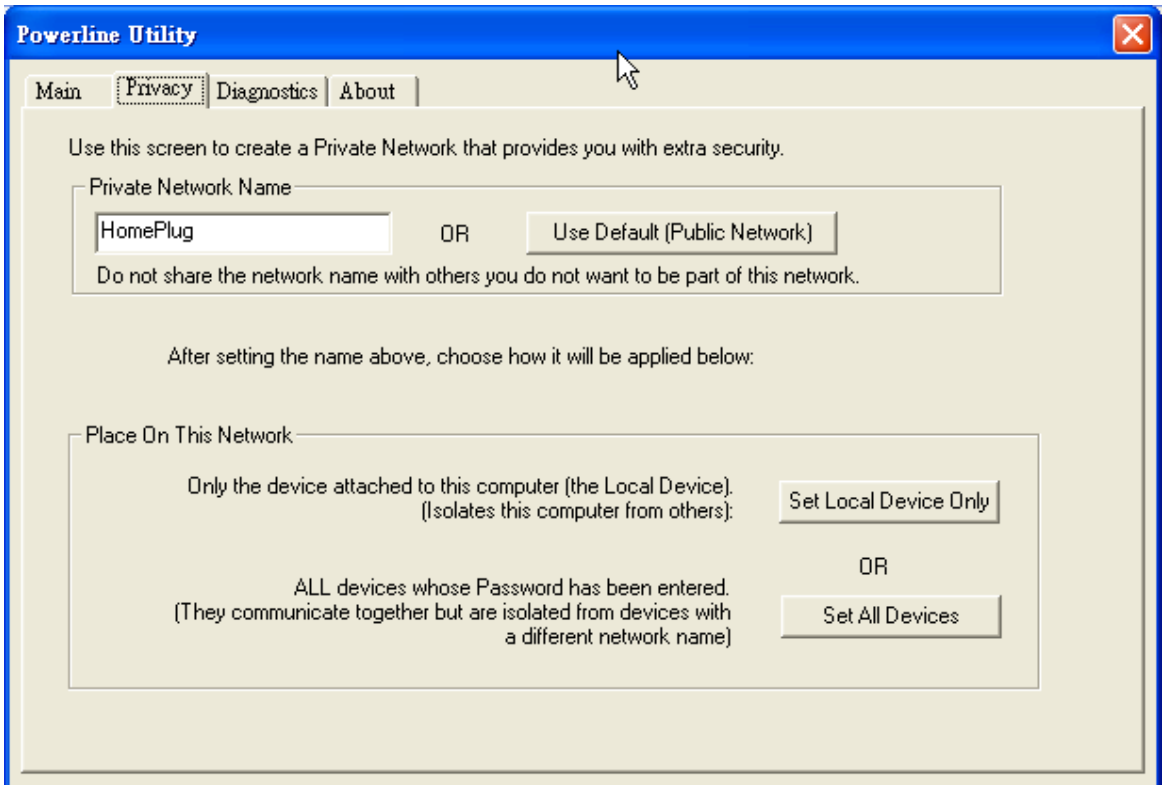
4.5.1 When the remote Powerline devices can not connect or access?

When you find that the computer can not connect to another or the remote Powerline device can not found by Powerline utility, please follow up the steps to check the problem.

Step 1: Open the utility to make sure you can or not access the device. You can check the **Main** tab for local or remote Powerline devices status. If you can not detect the remote Powerline devices, that's mean you or somebody change the Powerline network ID.



Step 2: Connect to the other Powerline bridge or router directly which can not detect at **Main** tab at step 1. On the **Privacy** page, you can change the Private Network name as the same name with other Powerline device or just press the **Use Default (Public Network**). Please press the **Set Local Device Only** button for change the network name. Please make sure the Private Network Name value must the same with the other Powerline device.


Powerline Utility
Main
Privacy
Diagnostics
About
Use this screen to create a Private Network that provides you with extra security.
Private Network Name
HomePlug
OR
Use Default (Public Network)
Do not share the network name with others you do not want to be part of this network.
After setting the name above, choose how it will be applied below:
Place On This Network
Only the device attached to this computer (the Local Device). (Isolates this computer from others):
Set Local Device Only
OR
ALL devices whose Password has been entered. (They communicate together but are isolated from devices with a different network name)
Set All Devices

Step 3: Connect the PC to the previous Powerline device, and you can find now the other Powerline device can be found at the **Main** tab.

Appendix A Glossary

Address mask

A bit mask used to select bits from an Internet address for subnet addressing. The mask is 32 bits long and selects the network portion of the Internet address and one or more bits of the local portion. Sometimes called subnet mask.

AAL5

ATM Adaptation Layer - This layer maps higher layer user data into ATM cells, making the data suitable for transport through the ATM network.

ADSL

Asymmetric digital subscriber line.

ATM

Asynchronous Transfer Mode - A cell-based data transfer technique in which channel demand determines packet allocation.
ATM offers fast packet technology, real time; demand led switching for efficient use of network resources.

AWG

American Wire Gauge - The measurement of thickness of a wire.

Bridge

A device connects two or more physical networks and forwards packets between them. Bridges can usually be made to filter packets, that is, to forward only certain traffic. Related devices are: repeaters which simply forward electrical signals from one cable to the other, and full-fledged routers which make routing decisions based on several criteria.

Broadband

Characteristic of any network multiplexes independent network carriers onto a single cable. Broadband technology allows several networks to coexist on one single cable; traffic from one network does not interfere with traffic from another. Broadcast A packet delivery system where a copy of a given packet is given to all hosts attached to the network. Example: Ethernet.

CO

Central Office. Refers to equipment located at a Telco or service provider's office.

CPE

Customer Premises Equipment located in a user's premises.

DHCP (Dynamic Host Configuration Protocol)

DHCP is software that automatically assigns IP addresses to client stations logging onto a TCP/IP network. DHCP eliminates having to manually assign permanent IP addresses to every device on your network. DHCP software typically runs in servers and is also found in network devices such as Routers.

DMT

Discrete Multi-Tone frequency signal modulation

Downstream rate

The line rate for return messages or data transfers from the network machine to the user's premises machine.

DSLAM

Digital Subscriber Line Access Multiplex

Dynamic IP Addresses

A dynamic IP address is an IP address that is automatically assigned to a client station (computer, printer, etc.) in a TCP/IP network. Dynamic IP addresses are typically assigned by a DHCP server, which can be a computer on the network or another piece of hardware, such as the Router. A dynamic IP address may change every time your computer connects to the network.

Encapsulation

The technique used by layered protocols in which a layer adds header information to the protocol data unit (PDU) from the layer above. As an example, in Internet terminology, a packet would contain a header from the physical layer, followed by a header from the network layer (IP), followed by a header from the transport layer (TCP), followed by the application protocol data.

Ethernet

One of the most common local area network (LAN) wiring schemes, Ethernet has a transmission rate of 10 Mbps.

FTP

File Transfer Protocol. The Internet protocol (and program) used to transfer files between hosts.

Hop count

A measure of distance between two points on the Internet. It is equivalent to the number of routers that separate the source and destination.

HTML

Hypertext Markup Language - The page-coding language for the World Wide Web.

HTML browser

A browser used to traverse the Internet, such as Netscape or Microsoft Internet Explorer.

http

Hypertext Transfer Protocol - The protocol used to carry world-wide-web (www) traffic between a www browser computer and the www server being accessed.

ICMP

Internet Control Message Protocol - The protocol used to handle errors and control messages at the IP layer. ICMP is actually part of the IP protocol.

Internet address

An IP address is assigned in blocks of numbers to user organizations accessing the Internet. These addresses are established by the United States Department of Defense's Network Information Center. Duplicate addresses can cause major problems on the network, but the NIC trusts organizations to use individual addresses responsibly. Each address is a 32-bit address in the form of x.x.x.x where x is an eight- bit number from 0 to 255. There are three classes: A, B and C, depending on how many computers on the site are likely to be connected.

Internet Protocol (IP)

The network layer protocol for the Internet protocol suite

IP address

The 32-bit address assigned to hosts that want to participate in a TCP/IP Internet.

ISP

Internet service provider - A company allows home and corporate users to connect to the Internet.

MAC

Media Access Control Layer - A sub-layer of the Data Link Layer (Layer 2) of the ISO OSI Model responsible for media control.

MIB

Management Information Base - A collection of objects can be accessed via a network management protocol, such as SNMP and CMIP (Common Management Information Protocol).

NAT

Network Address Translation - A proposal for IP address reuse, where the local IP address is mapped to a globally unique address.

NVT

Network Virtual Terminal

PAP

Password Authentication Protocol

PORT

The abstraction used by Internet transport protocols to distinguish among multiple simultaneous connections to a single destination host.

POTS

Plain Old Telephone Service - This is the term used to describe basic telephone service.

PPP

Point-to-Point-Protocol - The successor to SLIP, PPP provides router-to-router and host-to-network connections over both synchronous and asynchronous circuits.

PPPoE

PPP over Ethernet is a protocol for connecting remote hosts to the Internet over an always-on connection by simulating a dial-up connection.

Remote server

A network computer allows a user to log on to the network from a distant location.

RFC

Request for Comments - Refers to documents published by the Internet Engineering Task Force (IETF) proposing standard protocols and procedures for the Internet. RFCs can be found at www.ietf.org..

Route

The path that network traffic takes from its source to its destination. The route a datagram may follow can include many routers and many physical networks. In the Internet, each datagram is routed separately.

Router

A system responsible for making decisions about which of several paths network (or Internet) traffic will follow. To do this, it uses a routing protocol to gain information about the network and algorithms to choose the best route based on several criteria known as "routing metrics".

Routing table

Information stored within a router that contains network path and status information. It is used to select the most appropriate route to forward information along.

Routing Information Protocol

Routers periodically exchange information with one another so that they can determine minimum distance paths between sources and destinations.

SNMP

Simple Network Management Protocol - The network management protocol of choice for TCP/IP-based Internet.

SOCKET

(1) The Berkeley UNIX mechanism for creating a virtual connection between processes.
(2) IBM term for software interfaces that allow two UNIX application programs to talk via TCP/IP protocols.

Spanning-Tree Bridge Protocol (STP)

Spanning-Tree Bridge Protocol (STP) - Part of an IEEE standard. A mechanism for detecting and preventing loops from occurring in a multi-bridged environment. When three or more LAN's segments are connected via bridges, a loop can occur. Because a bridge forwards all packets that are not recognized as being local, some packets can circulate for long periods of time, eventually degrading system performance. This algorithm ensures only one path connects any pair of stations, selecting one bridge as the 'root' bridge, with the highest priority one as identifier, from which all paths should radiate.

Spoofing

A method of fooling network end stations into believing that keep alive signals have come from and returned to the host. Polls are received and returned locally at either end

Static IP Addresses

A static IP address is an IP address permanently assigned to computer in a TCP/IP network. Static IP addresses are usually assigned to networked devices that are consistently accessed by multiple users, such as Server PCs, or printers. If you are using your Router to share your cable or DSL Internet connection, contact your ISP to see if they have assigned your home a static IP address. You will need that address during your Router's configuration.

Subnet

For routing purposes, IP networks can be divided into logical subnets by using a subnet mask. Values below those of the mask are valid addresses on the subnet.

TCP

Transmission Control Protocol - The major transport protocol in the Internet suite of protocols provides reliable, connection-oriented full-duplex streams.

TFTP

Trivial File Transfer Protocol - A simple file transfer protocol (a simplified version of FTP) that is often used to boot diskless workstations and other network devices such as routers over a network (typically a LAN).

Telnet

The virtual terminal protocol in the Internet suite of protocols - Allows users of one host to log into a remote host and act as normal terminal users of that host.

Transparent bridging

So named because the intelligence necessary to make relaying decisions exists in the bridge itself and is thus transparent to the communicating workstations. It involves frame forwarding, learning workstation addresses and ensuring no topology loops exist (in conjunction with the Spanning-Tree algorithm).

UDP

User Datagram Protocol - A connectionless transport protocol that runs on top of TCP/IP's IP. UDP, like TCP, uses IP for delivery; however, unlike TCP, UDP provides for exchange of datagrams without acknowledgments or guaranteed delivery. Best suited for small, independent requests, such as requesting a MIB value from an SNMP agent, in which first setting up a connection would take more time than sending the data.

UNI signaling

User Network Interface signaling for ATM communications.

Virtual Connection (VC)

A link that seems and behaves like a dedicated point-to-point line or a system that delivers packets in sequence, as happens on an actual point-to-point network. In reality, the data is delivered across a network via the most appropriate route. The sending and receiving devices do not have to be aware of the options and the route is chosen only when a message is sent. There is no pre-arrangement, so each virtual connection exists only for the duration of that one transmission.

WAN

Wide area network - A data communications network that spans any distance and is usually provided by a public carrier (such as a telephone company or service provider).

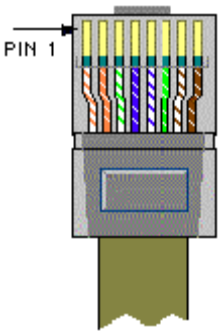
Appendix B Cabling / Connection

Network cables connect PCs in an Ethernet network Category 5, called "Cat5" for short is commonly used type of network cable today.

Cat 5 cables are tipped with RJ-45 connectors, which fit into RJ-45 port.

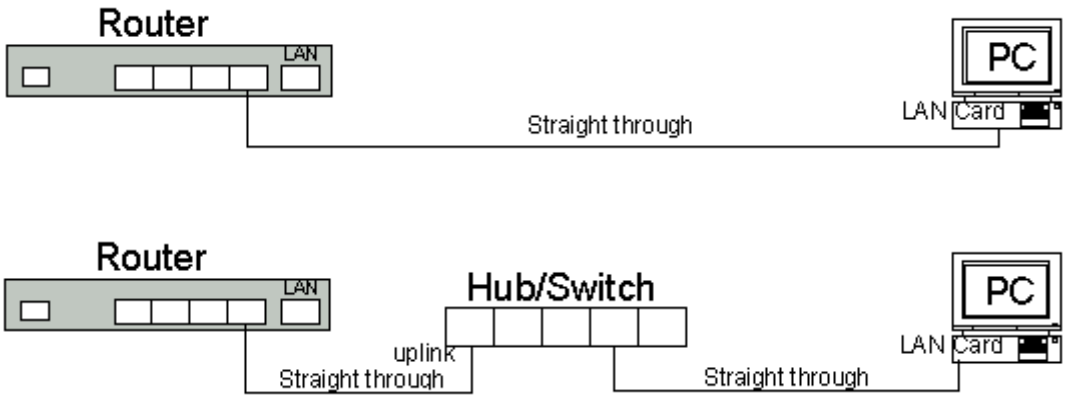
Straight-through vs. Crossover Cables:

Straight-through	
Wire	**Becomes**
1	1
2	2
3	3
6	6



Straight-through	
Wire	**Becomes**
1	1
2	2
3	3
6	6

LAN Connection:



To check LEDs light up when you finish connecting two pieces of hardware.